



US005599804A

# United States Patent [19]

## Mudge

[11] Patent Number: 5,599,804

[45] Date of Patent: Feb. 4, 1997

[54] FUNGICIDAL COMPOSITIONS FOR THE  
ENHANCEMENT OF TURF QUALITY

[75] Inventor: Laurence C. Mudge, Raleigh, N.C.

[73] Assignee: Rhone-Poulenc, Inc., Research Triangle  
Park, N.C.

[21] Appl. No.: 415,934

[22] Filed: Apr. 3, 1995

[51] Int. Cl.<sup>6</sup> ..... A01N 43/38; A01N 57/18;  
A01N 59/26[52] U.S. Cl. .... 514/141; 424/601; 424/602;  
424/605; 424/606; 514/410[58] Field of Search ..... 514/141, 410;  
424/601, 602, 605, 606

## [56] References Cited

## U.S. PATENT DOCUMENTS

2,129,013	9/1938	Linstead et al.	260/314
2,214,454	9/1940	Dent	260/314
2,276,860	3/1942	Niemann et al.	260/314
2,452,606	11/1948	Roselle	106/289
2,460,779	2/1949	Brouillard et al.	260/314.5
2,460,783	2/1949	Lecher et al.	260/314.5
2,471,794	5/1949	Sumner	260/314.5
2,485,167	10/1949	Rintelman	260/314.5
2,485,168	10/1949	Rintelman	260/314.5
2,556,729	6/1951	Bridgeton	260/314.5
2,613,128	10/1952	Baumann et al.	8/28
3,379,610	4/1968	Lyon et al.	167/22
3,632,328	1/1972	Gaskin et al.	71/3
3,950,265	4/1976	Albrecht et al.	252/311
4,139,616	2/1979	Ducet et al.	424/222
4,394,316	7/1983	Chao	260/429
4,956,183	9/1990	Miki et al.	424/630
5,171,853	12/1992	Thorp et al.	536/27
5,336,661	8/1994	Lucas	504/126
5,350,843	9/1994	Itoh et al.	540/138
5,380,842	1/1995	Itoh et al.	540/128

## FOREIGN PATENT DOCUMENTS

2412324	9/1975	Germany
2511077	9/1976	Germany
57-034781	7/1982	Japan
1-157904	6/1989	Japan
6-73397	3/1994	Japan
103345	6/1979	Poland

## OTHER PUBLICATIONS

S. Lessage, *Reduction of the Formation of Ethylenethiourea from Ethylenebis (dithiocarbamates) by Cupric Ions in Aqueous Media*, *J. Agric. Food Chem.* 28(4), pp. 787-790 (1980).A. Stevenson, *Fungicidal Compositions*, *Patent Journal*, p. 39 (Jul. 26, 1967).N. M. Bigelow et al., *Phthalocyanine Pigments, The Chemistry of Synthetic Dyes and Pigments*, pp. 577-606. (1960).  
W. S. Struve, *Phthalocyanine Dyes, The Chemistry of Synthetic Dyes and Pigments*, pp. 607-624 (1967).T. Ostmeier, *The Color Green, Golf Course Management* pp. 40-44 (Aug. 1994).M. E. Fenn et al; *Studies on the In Vitro and In Vivo Antifungal Activity of Fosetyl-Al and Phosphorous Acid*, *Phytopathology* 74 No. 5, pp. 606-611 (1984).

Primary Examiner—Allen J. Robinson

Attorney, Agent, or Firm—Bell, Seltzer, Park &amp; Gibson

## [57] ABSTRACT

Fungicidal compositions for the protection of turfgrass against crown and root rot are disclosed. The compositions comprise, as the active material, (a) a first active agent selected from the group consisting of (i) a monoester salt of a phosphorous acid (preferably aluminum ethyl phosphite), and (ii) phosphorous acid or an alkali or alkali earth metal salt thereof; and (b) a benzoporphyrin compound. Preferred compositions comprise 1 part by weight of the first active agent, and between about 0.01 and about 0.1 parts by weight of the benzoporphyrin compound.

23 Claims, No Drawings